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Racehorse Safety Summit Highlights Injury Rates, Integrity



Equine Injury Database research has shown horses that have been placed on a vet's list are at a greater risk of suffering a fatal injury than those that have not.

The eighth Welfare and Safety of the Racehorse Summit, held June 27 at the Keeneland Sales Pavilion, in Lexington, Kentucky, featured discussions on topics ranging from disaster preparedness, jockey injuries, and equine injuries to racing integrity, Thoroughbreds as sport horses, and racing surfaces.

The Grayson-Jockey Club Research Foundation and The Jockey Club organized and underwrote the summit. It hosted approximately 200 Thoroughbred industry representatives, including owners, breeders, horsemen, regulators, veterinarians, racetrack officials, jockeys, and media, as well as an international audience via a live online video stream. Donna Barton Brothers, former jockey and current NBC racing analyst, emceed the event,

which was free and open to the public.

In the day's first session Roberta Dwyer, DVM, MS, Dipl. ACVPM, a professor and extension veterinarian at the University of Kentucky (UK), discussed the importance of having a plan for yourself and your horses in case of a natural disaster. She said microchipping horses can aid in identification if they are separated from their owners.

Participants agreed and noted that

disaster preparedness also applies to racetracks, which must have plans in place when extreme weather occurs. Sal Sinatra, president and general manager of the Maryland Jockey Club, said significant weather fluctuations from day to day can disrupt racing.

In a session on jockey safety, Peta Hitchens, MVPH Mgt, PhD, a research fellow in the University of Melbourne's Equine Orthopaedic Research Group, in Australia, discussed horse and jockey injuries. She stressed the importance of horse acclimatization, good jockey/horse combinations, understanding racehorse injuries, record-keeping, and regular analysis to check for decreasing incidence of both.

"One of the most important things to me has been the standardization of both record-keeping and the regular analysis of this data," she said. "We will never know if our interventions are successful unless we can go back and look at whether our incidence of jockey falls and injuries and racehorse fatalities have reduced and the reasons for both."

Also on jockey safety, Carl Mattacola, PhD, associate dean of academic and faculty affairs at UK, noted that horse racing's lack of centralization has made it difficult to implement national concussion protocols.

In an Equine Injury Database update, Tim Parkin, BVSc, PhD, Dipl.

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Racehorse Safety Summit

ECVPH, MRCVS, professor of veterinary epidemiology at the University of Glasgow, in Scotland, reviewed fatal injury risk factors, focusing on the time a horse spends with one trainer and a horse's presence on the vet's list with respect to injury risk.

For horses that have been with more than one trainer, injury risk decreases with every extra month spent with the same trainer, he said. And horses that have been placed on a vet's list are at a greater risk of suffering a fatal injury than those that have not.

Parkin also discussed the unique challenges of analyzing Equine Injury Database data. "We're not lacking data; statistical power isn't an issue," he said. "The issue is the frequency of outcome (low rate of fatal injuries) and the scope of data."

He also stressed the need to increase data collection on nonfatal racing and training injuries.

Kentucky Derby and multiple-stakes-winning trainer Graham Motion shared insight into the trainer's responsibilities regarding horse welfare in a Q&A session with Grayson-Jockey Club Research Foundation president Edward L. Bowen.

"Don't be afraid to pass bad news on" to a horse's connections, Motion said. "You have to know when it's time to stop on a horse. We are there to protect (horses). I think that's a tremendous responsibility that I take very seriously."

In a session on integrity, attendees learned about protocols put in place in California, Kentucky, and at the Breeders' Cup. For example, California's program to monitor horses deemed to be "at-risk" has resulted in a 35% drop in fatalities.

Dora Delgado, Breeders' Cup senior vice president of racing and nominations, discussed the organization's security and out-of-competition testing protocols and efforts to enable best practices in the industry, no matter where the event is held.

"Whatever circumstances we can come up with, we've got a plan and a protocol for it," said she. "We want to make sure that everybody has the ability to get the best program available to them."

One afternoon session focused on Thoroughbreds as sport horses after



Consistent surfaces and proper moisture, especially on dirt tracks, are important for keeping racehorses safe.

their racing careers and promoting their abilities. One point of emphasis was avoiding the "one last race" mentality sometimes encountered in Thoroughbred racing and retiring horses sound to give them the best chance at a second career.

Jen Roytz, Retired Racehorse Project executive director, encouraged trainers to discuss aftercare with new owners as part of an "on-board" protocol.

Four-star eventer and off-track Thoroughbred owner Katie Ruppel, of Yellow Rose Eventing, in Anthony, Florida, also encouraged trainers to look out for their horses to give them a chance at a second career. "I'd like trainers to ... have a little more afterthought as to what their horses can do when they're done racing," she said.

In the final presentation, Mick Peterson, PhD, director of UK's Ag Equine Programs and executive director of the Racing Surfaces Testing Laboratory, noted the importance of consistent surfaces and proper moisture, especially on dirt tracks. He also highlighted the increased incidence and popularity of turf racing in the United States.

"We need to invest in ways to increase safe turf racing," he said. "It should be a priority for the sport."

In sum, Bowen said, "This year's summit offered an excellent mix of discussions on a variety of issues that demonstrate the industry's dedication to the welfare of both humans and equines. It is encouraging to see the progress that the industry has made in areas from equine and jockey injuries to track surfaces and safely transitioning Thoroughbreds to second careers."

View a video replay of the summit at grayson-jockeyclub.org/WelfareSafety/includes/2018Wss_agenda.asp. **UK**

>Edited press release from The Jockey Club.

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Poison Hemlock: Toxic to Horses, Livestock

Poison hemlock (*Conium maculatum*) is toxic to a variety of species including humans, horses, birds, wildlife, cattle, sheep, goats, and pigs. People are usually poisoned when they mistake hemlock for edible plants such as parsley, wild carrot, or wild anise and consume it inadvertently. The first notable example of human poisoning was when Socrates ingested a tea made from poison hemlock and died in 399 B.C.

As the plant begins to send up flower stalks, the leaves are alternately arranged on the main stem. Each individual leaf is pinnately compound with several pairs of leaflets that appear along opposite sides of the main stalk. As poison hemlock matures, it can grow to about 6 to 8 feet tall (Figure 1). At maturity the plant is erect, often with multibranched stems, and forms a deep taproot. Poison hemlock has hollow stems that are smooth with purple spots along the lower stem that help distinguish it from other plants similar in appearance. The flowers, when mature, are white and form a series of compound umbels (an umbrella-shaped cluster of small flowers) at the end of each terminal stalk. Although poison hemlock is often associated with areas with moist soil conditions, it can also survive in dry sites.

While poison hemlock is often seen along roadways, abandoned lots, fencerows, and other noncropland sites, it has recently expanded into grazed pasturelands and hayfields. It is classified as a biennial that reproduces only by seed, can complete its life cycle as a winter annual in Kentucky if it germinates in

fall. Flowers and new seed are typically produced in late May and June. Plants emerge as a cluster of leaves that form a rosette. Poison hemlock is most noticeable at this stage of growth in late fall through early spring with its parsley-like leaves that are highly dissected or fernlike (Figure 2). The individual leaves are shiny, green, and triangular.

Cattle, horses, and goats are considered to be the most susceptible domesticated animals, although other livestock species can be affected, as well. Owners commonly ask how much of the plant cattle need to eat to kill them, but, unfortunately, the answer isn't clear-cut. Cattle have died after eating as little as 0.2-0.5% of their body weight in green hemlock, but the plant's toxic alkaloid content varies considerably depending on growth stage, season, moisture, temperature, time of day, and geographic region (for example, southern plants are more toxic than northern plants).

Clinical signs of poisoning can occur rapidly within 30 minutes to 2 hours depending on the animal, quantity consumed, and other ecologic factors. Poison hemlock foliage has an unpleasant mouse urinelike odor detectable when near the plant or when a stem or leaf is crushed. Livestock generally avoid it unless forage is scarce, but it could be accidentally consumed in hay or silage. Poison hemlock contains eight piperidine alkaloids; the two major ones are coniine (major alkaloid in the seed) and gamma-Coniceine (predominate in green, vegetative growth). These alkaloids cause muscle paralysis by



Figure 1. Mature poison hemlock plants growing in hayfield.



Figure 2. Poison hemlock rosette

acting as neuromuscular blocking agents. Signs of acute poisoning include:

- Nervousness, trembling, muscle weakness, and incoordination;
- Salivation (slobbering);
- Initial stimulation or excitement followed by depression;
- Pupil dilation;
- Weak heartbeat;
- Musty, mousy breath and urine odor;
- Prolapse of the third eyelid across the cornea; and
- Death by respiratory failure due to paralysis of respiratory muscles.

Although acute disease is a primary concern, an equally serious problem is subacute intoxication of pregnant livestock that causes deformed bones and joints in calves and pigs. The plants must be eaten for an extended period during the first trimester of pregnancy. The susceptible stage of gestation in cattle is from 50 to 75 days for skeletal defects to occur. These alkaloids continuously reduce fetal movement during tissue formation, resulting in crooked legs and deformed necks and spines. Less commonly, cleft palate results

Poison Hemlock

from lack of fetal head and neck movement at 30 to 50 days gestation, resulting in the tongue preventing normal palate closure during embryo development.

Veterinarians base their diagnosis on history of plant ingestion, clinical signs, and chemical analysis for presence of alkaloids in rumen contents. No specific treatment exists, the prognosis for recovery is good if acute poisoning does not progress to respiratory failure and death. Keep affected animals quiet, however, as overexcitement and stress could exacerbate clinical signs and result in death.

Public health is a concern when dealing with poisoned food animals because alkaloid residues could remain in meat. Some plant toxins are eliminated in milk, which is important to consider if the milk consumed by a calf or human.

As mentioned, most animals tend to avoid poison hemlock if other forage is readily available. However, animals



Figure 3. Field heavily infested with mature poison hemlock.

could be more prone to consuming the green plants during the winter and spring when other forage species are limited. All parts of the plant, including the seeds, contain the toxic principles coniine and gamma-Coniceine, which is considerably more toxic than coniine and is at its highest concentration in early growth. Ingestion of fresh, green plant material can quickly produce signs of intoxication within an hour, and signs can last for several hours.

As poison hemlock matures, gamma-Coniceine is reduced (chemically changed) to the less-toxic alkaloid coniine. Seeds and dried plant material contain the highest concentrations of coniine. Toxicity might be somewhat reduced in dried plants due to the alkaloids' volatility, but the potential for toxicity still exists, particularly when a sufficient quantity is consumed in dried hay. Seeds are highly toxic and can be a source of poisoning when they contaminate cereal grains fed to livestock. Avoid feeding animals hay or grain known to contain poison hemlock.

The principle poison hemlock control strategy is to prevent seed production, which can be challenging because one fully mature plant can produce 35,000 to 40,000 new seeds. It is too late to utilize herbicide control methods after plants have produced flowers. Instead, owners should use mechanical control efforts, such as mowing or cutting down individual plants, just before peak flower production to avoid or reduce the amount of new seed being produced.

Make note of areas heavily infested with poison hemlock (Figure 3), and begin to look for emergence of new plants in the fall. Late fall (November) or early spring (March) are the best times to apply herbicide treatment. In grass pastures and hayfields herbicide products containing 2,4-D can be effective when applied to young, actively growing plants in the rosette stage. Spot treatments with products containing 2,4-D; triclopyr; or glyphosate can also be used to control hemlock growth in some locations. **UK**

>Michelle Arnold, DVM, UK ruminant extension veterinarian, and J. D. Green, MS, PhD, extension weed scientist at UK, provided this information.

GRAD STUDENT SPOTLIGHT

MARIANO CAROSSINO, DVM, PHD

From: Buenos Aires, Argentina

Degrees and institutions where received:
DVM, Escuela de Veterinaria, Universidad del Salvador
PhD, UK Gluck Equine Research Center.

Mariano Carossino, DVM, PhD, decided to come to UK after meeting former Gluck Center professor of virology Udeni Balasuriya, BVSc, MS, PhD, at the International Equine Infectious Diseases Conference in 2012 and learning about his equine viral arteritis research.

Over the past five years Carossino completed his doctoral research and other projects under Balasuriya's guidance. His main research project was a USDA-funded project to identify host genetic factors associated with persistent equine arteritis virus infection in the stallion's reproductive tract. Carossino used virology, molecular biology, immunopathology, reproductive immunology, and a variety of classical and molecular techniques to help answer the team's research questions.

"The unparalleled opportunity to work on a highly productive and ambitious research project and the ability to utilize several state-of-the-art research tools was a privilege for me," Carossino said. "The ability to collaborate with different researchers at the Gluck Center, UK Veterinary Diagnostic Laboratory, and other institutions taught me how to establish and maintain research collaborations with a multidisciplinary research team."

Carossino defended his PhD dissertation at the end of May and joined Balasuriya, now based at Louisiana State University's School of Veterinary Medicine, in July. **UK**

>Hailee Adams is a communications and student relations intern for UK Ag Equine Programs.



Study: Most U.S. Horses Low, Moderate Strongyle Egg Shedders

Veterinarians know that strongyle parasites and the diseases they can cause are issues for grazing horses worldwide. However, there's been little research on their precise prevalence and geographic distribution in the U.S.

To bridge that knowledge gap, researchers recently examined the results from the National Animal Health Monitoring Systems Equine 2015 study to determine strongyle parasite egg shedding patterns in the U.S. equine population.



Horses with daily pasture access in the previous 30 days had higher odds of egg presence and greater median egg counts.

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In the study, horse owners from 28 states completed a questionnaire about parasite management practices at their facilities. Those responses, paired with fecal egg count (FECs) results, revealed that:

- Most adult equids in the U.S. were low or moderate strongyle egg shedders;
- 30% of the horse population sheds 80% of the eggs;
- Horses in the Southeast had the greatest odds of having strongyle eggs present on a FEC;
- Horses in the Western U.S. (Arizona, California, Colorado, Montana, Oregon, and Wyoming) had significantly lower strongyle prevalence than horses residing in the rest of the country;
- Season impacted population levels—horses across the country had higher fecal egg counts in summer and fall;
- Horses with daily pasture access in the previous 30 days had higher odds of egg presence and greater median egg counts;
- Time since last deworming and the type of dewormer used was significantly associated with strongyle egg prevalence—equids treated with macrocyclic lactone class of drugs had lower odds of strongyle egg presence at 120 days since the last deworming; and
- Younger horses had higher egg count levels than their older counterparts.

"This is consistent with findings elsewhere in the world," said researcher Martin Nielsen, DVM, PhD, Dipl. EVPC, ACVM, associate professor of parasitology and Schlaikjer Professor of Equine Infectious Disease at UK's Gluck Equine Research Center, in Lexington. "Confirming this information helps us design good parasite control strategies to maintain effectiveness and avoid further parasite resistance."

UKVDL Disease Mapping Initiative

FEATURED MAP

Potomac Horse Fever

This month's featured map is Potomac horse fever (PHF). Potomac horse fever is caused by *Neorickettsia risticii*, an organism found in some flukes (a wormlike parasite) that infect aquatic snails and insects (such as caddisflies and mayflies). Horses can be exposed by inadvertently ingesting aquatic insects infected with flukes carrying the bacteria or by drinking flukes directly from rivers or streams. However, even horses residing far from water bodies aren't out of PHF's reach, as vectors can be attracted to barn and stall lights and inadvertently end up in horses' feed or water sources.

The incubation period is 10 to 18 days. Initial clinical signs include anorexia, lethargy, and fever, followed by enterocolitis, dehydration, and diarrhea. This could progress to toxic shock, laminitis, or death (30% mortality rate). The disease can also cause abortion in pregnant mares and endotoxemia.

As of July 23, the University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) had seen five positive PHF cases this month.

For questions or concerns about disease outbreaks, contact UKVDL at 859-257-8283. [UK](#)

>Jacqueline Smith, PhD, MSc, BSc, Dipl. AVES, UKVDL epidemiologist and adjunct professor of epidemiology at Lincoln Memorial University, is the founder of the UKVDL Disease Mapping Initiative, a database designed to record all infectious disease cases submitted to the UKVDL. Erica Larson, news editor of *The Horse*, contributed to this article.

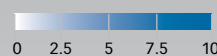
POTOMAC HORSE FEVER AS FINAL DIAGNOSIS FROM NECROPSY

January 1, 2010-Present

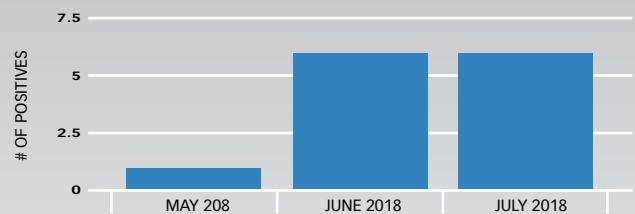


POTOMAC HORSE FEVER PCR+

January 2018 -Present



POTOMAC HORSE FEVER PCR+



See each month's featured map at vdl.uky.edu/FeaturedMap

Stronglye Egg Shedders

Specifically, the data support recommendations that horses require individualized deworming treatment plans.

“For example, we know that equine parasite control has to be approached very differently in the western part of the country,” he said. “Outside this region, it is also very useful to know that parasite infection patterns are very uniform.”

Ultimately, Nielsen said, recognizing the variance in stronglye populations can help us refine parasite control recommendations depending on region, pasture access, and age. **UK**

>Katie Navarra has worked as a freelance writer since 2001.

Farm-Wise Equine Parasite Control Strategies



KRISTEN JANICK

One tradition that must be bucked is deworming horses at regular intervals. Blanket parasite control strategies have led to widespread drug resistance in many parasite populations.

Change can be hard, especially for horse owners. We follow the seemingly indisputable rules of horse care and management that have been handed down to us from generations past. And we can be taken aback when someone dares question our decades-old practices.

One tradition that must be bucked, however, is deworming horses at regular intervals. Blanket parasite control strategies have led to widespread drug resistance in many parasite populations. And if farm and boarding barn owners don't transition to a more targeted approach, then the resistance of all parasite populations to all drugs on the market could very soon become a reality.

Each horse has his own individual needs when it comes to parasite control. But when you're responsible for deworming a number of horses on one property, how do you meet each one's needs? The answer lies in collecting a fecal sample prior to deworming and calculating the number of parasite eggs within it.

“There's really no way to build a parasite control program without using fecal egg counts (FEC),” says Martin Nielsen, DVM, PhD, Dipl. EVPC, ACVM, associate professor of parasitology at the UK Gluck Equine Research Center. Nielsen is one of the foremost experts in the field of equine parasitology and chair of the American Association of Equine Practitioners (AAEP) Parasite Control Guidelines (aaep.org/parasite-control-guidelines) committee.

Horse owners that don't use egg counts can have a false sense of security; they might assume the anthelmintic (deworming) products they are using are working when, in reality, they have no way of knowing. “I feel like I spend all my time advocating for this, but these habits are slow to change,” he says.

John Haffner, DVM, associate professor at Middle Tennessee State University's School of Agribusiness and Agriscience, in Murfreesboro, oversees the deworming program for the university's 50-horse herd. “When I started practice years ago, we dewormed every horse as often as we could,” he says. “Some horses got wormed monthly. It may have been necessary back then,

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Parasite Control Strategies

but with the advent of (the anthelmintic) ivermectin and the decline of large strongyles, it doesn't make sense to deworm horses like that anymore. All horses aren't suffering from heavy parasite burdens."

"It's not just that you might be spending money on a drug that isn't working, but with a (parasite) population that is resistant to that class of drug, you can actually increase the intensity of resistance in that population by using a drug that doesn't work anymore," says Craig Reinemeyer, DVM, PhD, president of East Tennessee Clinical Research Inc., in Rockwood, and another leading equine parasitology expert.

So, with these veterinarians' help, let's find out how to craft an appropriate deworming program for every horse in your barn.

It's All About Resistance

Horse owners currently use three drug classes to fight parasites: benzimidazoles (e.g., fenbendazole and oxi-bendazole), pyrimidines (pyrantel salts such as pyrantel pamoate and pyrantel tartrate), and macrocyclic lactones (e.g., ivermectin and moxidectin alone or combined with praziquantel).

These drugs' efficacy, which Reinemeyer says was at least 95% when they were first approved, has changed over the past few decades.

"There's no big broad-spectrum, umbrella-type product anymore that we can just give and know it gets everything in the horse," says Nielsen. "There's also not any product that we can just discard and kick out and never use anymore. Each of the products currently available has some resistance issues in some equine parasites, but each of them still has a use for some parasites infecting horses."

For instance, Nielsen says, small strongyles (cyathostomins, the parasite of most concern in adult horses) show widespread resistance against all benzimidazoles and pyrantel salts and the beginnings of resistance against the macrocyclic lactones. In fact, he says he'd be surprised to find a farm that doesn't have resistance issues against those first two drug classes.

In many places, moxidectin and ivermectin only suppress strongyle egg production (by paralyzing and killing

internal parasites) for three to five weeks before counts return to pretreatment levels, he says. This is in contrast to the typical egg reappearance periods we used to see of three months for moxidectin and six to eight weeks for ivermectin.

Reinemeyer adds that veterinarians are finding ivermectin resistance in most ascarid (roundworm, which is prevalent in foals) and some pinworm populations in the United States. And we might also start seeing more widespread ascarid resistance to the pyrantel salts, he says.



Older horses and those with PPID, equine metabolic syndrome, or that are immunocompromised also have special parasite control needs.

These resistance issues concern Nielsen because they're only likely to increase in all drug classes. "Even the cheapest dewormer becomes expensive if it doesn't work at all," he says. And wasted money is one thing; the health risk that you're running with your horses is another.

While Nielsen and others have been working to develop new anthelmintic products (read about these at TheHorse.com/36473), they're not out of the research phase yet.

Developing a Strategy

The goal of any parasite control program, says Nielsen, is to reduce the level of egg shedding in your herd to, in turn, reduce pasture contamination and parasite infection. Before developing a

deworming strategy for your farm, consider your area's active grazing season and the age of each horse.

Then measure each horse's fecal egg count to determine his shedding status. Low shedders pass no more than 200 eggs per gram of feces; moderate shedders pass 200-500 eggs per gram; and high shedders pass 500 or more eggs per gram, says Reinemeyer. This is crucial to know, he explains, because only 20% of your horse population passes about 80% of all parasite eggs on your property. Once you've tested a mature horse several times to determine his

shedding status, his classification is unlikely to change.

Elizabeth Houtsma and her husband, Greg Houtsma, DVM, own Hillside H Ranch, a small Warmblood breeding farm in Warrensburg, Missouri, as well as Midwest Performance Equine and Warrensburg Animal Hospital. They switched from a traditional rotational dewormer schedule and began using FEC testing in 2005 due to parasite resistance concerns.

"Because of our fecal egg count testing, we've been able to determine which horses are high shedders and which horses are not," says Elizabeth Houtsma, adding that she and her husband test any horse new to their property before deworming, after deworming, and periodically through the first year

Exposed

ik-spōzd

adj. not shielded or protected



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to determine its shedding level. They only test longtime residents once a year or every other year, unless they suspect a problem. They test horses under 2 and seniors more frequently.

For adult horses in your herd, perform FECs during your region's active grazing period—typically once in the spring and again in the fall after worms have accumulated all year—and deworm as needed.

Juvenile horses require an alternate approach, says Nielsen, because foals, yearlings, and young horses have different parasites and higher burdens and are more susceptible to disease. "It's like two different species of animals," he says, adding that a young horse's age is particularly important; as his immune system develops, it's better equipped to eradicate parasites.

Around four to six months of age, horses' immune systems develop to a point they're able to kick out the ascarids; this is when strongyles start increasing in number, says Nielsen. Fecal egg counts at weaning time can help reveal if a young horse has reached this point, and what type of parasites he has, so you can administer the appropriate dewormer.

Horses that are being transported, competing, or in training tend to have higher egg counts, but not necessarily due to higher parasite burdens, says Nielsen. More likely, these horses have weaker immune responses due to stress, which allows the parasites they already have to produce more eggs. Therefore, run FECs on any transient horse or horse in training at least twice a year. If one becomes a high shedder, you can change his treatment regimen.

"It's just nice to make sure you get those horses treated so they're not shedding and contaminating the environment everywhere they go and after they come home," says Nielsen.

Older horses and those with pituitary pars intermedia dysfunction (PPID or equine Cushing's disease), equine metabolic syndrome, or that are immunocompromised also have special parasite control needs. Researchers have shown that horses over 20 are significantly more likely to have high egg counts than middle-aged horses. Elizabeth Houstma says she's seen this in her own

population of mares: The geriatric ones are typically high shedders.

Nielsen says these horses might need an additional treatment a month to six weeks after the initial one because eggs might start reappearing sooner.

Deworming Tips

As we've discussed, a horse's shedding status dictates how frequently he should be dewormed. However, our sources say adult horses, regardless of fecal egg count, should be dewormed once or twice a year, usually in the spring and fall, to help eradicate small strongyles, tapeworms, and sometimes pinworms—the three worm species of most concern for adult horses.

If you experience winter where you live, you won't need to deworm during that season because the cold prevents parasites from developing into an infective stage, says Nielsen.

Because FECs only identify small strongyle and ascarid burdens, owners

should administer a dewormer against tapeworms (e.g., praziquantel or pyrantel pamoate) at least once a year to control them. If you notice bot eggs on horses' legs or around their manes, you can administer an effective drug class (ivermectin and moxidectin) to help prevent the larvae from making their way into the horse's mouth and gastrointestinal tract.

Testing Your Anthelmintics

To evaluate the efficacy of a drug class on your property, also be sure to perform fecal egg count reduction tests (there's an acronym for that, too: FECRT). Have your veterinarian perform an FEC on each horse before treatment, deworm that horse as necessary, test a subsequent fecal sample from the same animal roughly 10 to 14 days later, and compare the two.

"You need to do it for every group of horses or class of anthelmintic that you use on the farm," says Reinemeyer.

Nielsen, Reinemeyer Publish Second Edition of Equine Parasite Control Handbook

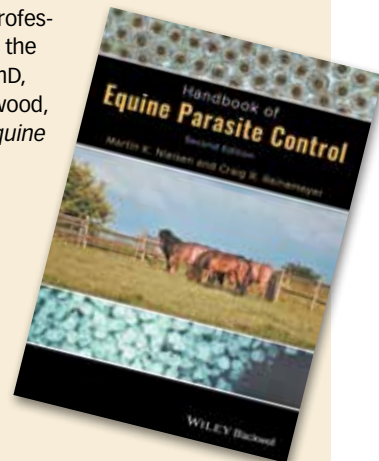
Martin Nielsen, DVM, PhD, Dipl. EVPC, ACVM, associate professor and Schlaikjer Professor of Equine Infectious Disease at the UK Gluck Equine Research Center, and Craig Reinemeyer, PhD, president at East Tennessee Clinical Research Inc., in Rockwood, have co-authored the second edition of the *Handbook of Equine Parasite Control*, released this month.

The second edition, published by Wiley, offers a thorough revision to this practical equine parasitology manual. Incorporating new information and diagnostic knowledge throughout, it also includes five additional sections and new information on computer simulation methods maps to show the spread of anthelmintic resistance. The book also features 30 new figures and expanded information on parasite occurrence and epidemiology, diagnostics, treatment strategies, clinical significance of infections, anthelmintic resistance, and environmental persistence.

"We have learned a lot since the first edition was published, and we felt it was time for an update," Nielsen said. "Although a limited number of people work actively in equine parasitology research worldwide, the amount of work done in the last six years is remarkable. A lot of it has direct practical implications for people faced with parasite control in the field. They are the audience this book is intended for, and we are excited to be providing new and updated information."

The handbook is targeted for equine practitioners, veterinary students, and veterinary technicians dealing with parasites in horses. The first edition was published by Wiley in 2012. For more information and to purchase the new release, visit wiley.com/buy/9781119382782. UK

>Jenny Evans, MFA, PhD candidate, is the senior veterinary science marketing and promotion specialist at the UK Gluck Equine Research Center.



Parasite Control Strategies

“You should get at least a 98% reduction of egg counts post-treatment with ivermectin and moxidectin and at least 90% with the other dewormers. If you’re not getting that now, then it means that the worms have changed. If you demonstrate that a particular class is worthless on your farm, you should never use it again,” for routine deworming. That drug, however, might still be useful against other parasites.

For those drug classes that are

effective, recheck them about every two years, he adds.

Not all horses need an FECRT. You can determine a product’s efficacy by testing about six horses in a herd that are known to have moderate to high egg counts, says Nielsen. If results come back showing any positives, the parasites on your property are resistant to that product.

Take-Home Message

Thanks to current widespread drug resistance in many parasite populations, it’s important for horse owners to understand that each horse has

individual deworming needs. Those needs depend on the horse’s parasite shedding status and the farm’s drug resistance status, both of which can be determined using fecal egg counts.

To develop a parasite control program for your farm, review the AAEP’s guidelines and talk to your veterinarian. Our sources agree that all facility managers and farm owners should adopt these protocols to avoid ending up with a world in which equine parasites are uncontrollable. **UK**

>Sarah Evers Conrad is a freelance writer based in Lexington, Kentucky.

COMMENTARY: Are Insect Bite Hypersensitivity Immunotherapies on the Horizon?

The season is upon us when approximately 10% of horses worldwide are faced with one of the most frustrating skin diseases in the equine industry, insect bite hypersensitivity (IBH), more commonly known as “sweet itch” or “summer eczema.” This allergic, recurrent, seasonal dermatitis develops when the immune system overacts or

becomes “hypersensitive” to allergens in the saliva primarily of biting midges (*Culicoides*) and other biting insects.

Although there is no cure for IBH, there is ongoing research to assess immunotherapies as future treatment options for horses suffering with IBH.

While IBH has a multifactorial cause, it is acknowledged that the immune

system plays a role in its development. Hypersensitivity reactions are classified into four types, and IBH is a combination of Type I and Type IV. Type I hypersensitivity reactions develop when antigen specific allergens bind to IgE and cross-link receptors on mast cells, basophils, and eosinophils. These cells release vasoactive amines, such as histamine, that affect blood vessel size and leakage and produce inflammatory cytokines and other mediators, which result in inflammation and pruritus (itchiness). Type IV reactions, often referred to as delayed-type hypersensitivity reactions, involve cell-mediated responses particularly of activated Th-2 lymphocytes which produce IL-5 cytokine and large numbers of eosinophils, both contribute to clinical IBH manifestations.

Immunotherapy treatment is based on a century-old concept that the immune system can be desensitized to specific allergens that trigger hypersensitivity reactions. Allergen immunotherapy (AIT) involves inoculation with gradually increasing doses of an allergen to which the individual is allergic. The incremental increases in exposure to the allergen cause the immune system to become less sensitive to the substance, which reduces the allergy signs when the substance is encountered in the future.

Data are conflicting as to whether or not traditional AIT therapies are successful in treating IBH. Research is now exploring whether IBH can be prevented by vaccination with recombinant *Culicoides* antigens versus whole antigen preparations to more successfully modulate the immune response, in particular, IgE response. Another



THE HORSE STAFF

About 10% of horses worldwide suffer from IBH, an allergic, recurrent, seasonal dermatitis.

Immunotherapies for IBH

interesting area under current investigation is oral immunotherapy, whereby transgenic barely expressing allergens are administered orally to prevent hypersensitivity to *Culicoides*.

Finally, given the important role of eosinophils in IBH pathology and the fact that IL-5 drives eosinophil activity, a novel and allergen independent vaccine has been evaluated that targets IL-5 and limits eosinophil recruitment to the affected skin. This is one of the few equine studies to investigate whether a vaccine can induce autoantibodies to cytokine IL-5 and result in clinical efficacy for IBH. This immunotherapeutic approach could be the new generation for treating chronic immune diseases and could signal that new therapies are on the horizon for horses suffering from IBH. **UK**

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>Reprinted from the Lloyd's *Equine Disease Quarterly*, July 2018, Volume 27, Number 3.

UK Ag Equine Programs Recognized for Excellence by American Horse Publications

The University of Kentucky's Ag Equine Programs was recognized with the winning e-newsletter in the business division for its *Bluegrass Equine Digest* at the American Horse Publications Equine Media Awards competition June 16 in Hunt Valley, Maryland. The *Bluegrass Equine Digest* took first place in a class that had seven entries.

The *Bluegrass Equine Digest* is a free monthly e-newsletter about equine research at UK that is distributed in conjunction with The Horse.com and supported by Zoetis. The newsletter launched in June 2009 and also received the top e-newsletter award in this category in 2013.

Additionally, UK Ag Equine Programs was recognized for two philanthropy-related videos it submitted in a category that featured 25 entries. Its Philanthropy Thank You video earned second and the Gluck Equine Research Center 30th Anniversary video was recognized with an honorable mention.

The AHP Equine Media Awards competition featured material published in 2017. Held since 1974, the AHP annual awards competition this year drew 823 entries from 108 members. **UK**

>Holly Wiemers, MA, APR, is communications and managing director for UK Ag Equine Programs.



Mineral of the Month: Chromium

Unlike many of the metals we've discussed in this series, it does not appear that ancient civilizations knew about chromium (Cr). Third-century weapons discovered in China, however, suggest a Cr oxide coating was used to protect against corrosion. Today Cr's most common industrial use is in stainless steel production and chrome plating.

As an essential trace element, Cr forms an important part of the glucose tolerance factor and, thus, plays a role in the communication between insulin and insulin receptors. It also plays various roles in lipid metabolism and immune function. In other livestock species, Cr supplementation has been associated with improved production, including increased growth rates, increased number of piglets born per litter, improved carcass composition, and higher milk yield.

In horses, however, the use of different sources and amounts of Cr in research studies makes it difficult



ANNE M. EBERHARDT/THE HORSE

Forage, commercial feeds, and supplements contribute to total dietary Cr intake and should all be accounted for when evaluating your horse's diet.

to directly compare study results. Consequently, the National Research Council's *Nutrient Requirements of Horses* (2007) does not currently provide a specific daily Cr intake recommendation. Nevertheless, Cr deficiency has never been documented in the horse. This could suggest that Cr naturally occurring in feedstuffs is sufficient to meet the horse's basic requirements. Based on work in mice and humans, researchers have speculated that signs of a Cr deficiency might only be observed as an impaired glucose/insulin response, but creating a truly deficient diet to test this

theory has been challenging.

There are many supplemental Cr sources for horses. In general, organic sources (e.g. Cr methionine) appear to be more bioavailable than inorganic sources (e.g. Cr chloride), and differences also exist within these groups. However, nutrition researchers have been able to use Cr oxide's poor bioavailability, as well as Cr bound to other compounds, to their advantage. This advantage stems from using Cr as a dietary marker that can be used to track how rapidly a feed moves through a horse's digestive tract and the feed's digestibility.

The recommended maximum tolerance level for Cr depends on the specific source of Cr used due to bioavailability differences. Therefore, it's important to talk to a nutritionist should you feel the need to evaluate your horse's Cr intake. Forage, commercial feeds, and supplements can contribute to total dietary Cr intake and should all be accounted for when evaluating your horse's diet. **UK**

>Mieke Holder, PhD, is an assistant research professor within UK's Department of Animal and Food Sciences.

Protecting Your Horse Against Eastern Equine Encephalomyelitis and West Nile Encephalitis



KEVIN THOMPSON/THE HORSE

The AAEP, in accordance with criteria defined by the American Veterinary Medical Association with respect to “core vaccines”—those that protect against diseases that are endemic, of potential public health significance, and represent a risk of causing severe disease—strongly recommends that horses be immunized against EEE and WNE.

The two most frequently encountered causes of equine encephalitis or encephalomyelitis in North America are Eastern equine encephalomyelitis (EEE) and West Nile encephalitis (WNE) viruses. Both are mosquito-borne and neurotropic. The respective viruses are not restricted to equids in terms of their host range; each can be transmitted to humans and certain other mammalian and avian species. Both diseases are a source of concern for the equine industry not only from the potentially life-threatening consequences of either infection, but also from the economic losses involved.

Eastern equine encephalomyelitis poses an annual threat to equids in the Gulf and Atlantic coastal states and the Great Lakes region, extending in certain years as far north as Eastern Canada. It is occasionally recorded in some inland states such as Arkansas, Oklahoma, Tennessee, Kentucky, and Iowa. Evidence of EEE activity is most often reported in Florida, in which it has been confirmed as early as January, as recorded in 2018. Over the past 15 years, the yearly incidence of EEE cases

in equids has ranged from 60 (2011) to 712 (2003), with an annual average of 206 cases. In 2017, 86 cases of the disease were reported in 13 states. In temperate regions, transmission of EEE virus is seasonal, occurring in the summer and the fall. In sub-tropical regions such as Florida, there is a year-round risk of EEE, with virus transmission peaking in the summer months.

Equids and humans are tangential or dead-end hosts of EEE virus and neither plays a role in the virus' natural life-cycle. Infections in horses, mules, and donkeys are frequently life-threatening; case fatality rates can be as high as 90%.

West Nile encephalitis is also a cause of significant concern to veterinary practitioners and members of the equine industry. Within four years following initial introduction of the causal virus in New York State in 1999, the virus had spread to 48 states and several provinces in Canada. Since 1999, the yearly incidence of WNE cases in equids has ranged from 60 (2000) to 15,257 (2002). The annual average number of cases over the past 10 years

was 272. In 2017, 307 equine cases were reported in 39 states.

Similar to EEE, WNE virus transmission is seasonal, occurring in the summer and extending well into the fall. Neither equids nor humans serve as amplifying hosts for WNE virus insofar as viremias are insufficient in magnitude and duration to infect mosquitoes. Unlike EEE, only about 10% of WNE virus-exposed horses will develop clinical infections. Reported case-fatality rates in affected horses can reach 30-40 percent, less than half that encountered in cases of EEE.

The American Association of Equine Practitioners (AAEP), in accordance with criteria defined by the American Veterinary Medical Association with respect to “core vaccines”—namely those that protect against diseases that are endemic, of potential public health significance, and represent a risk of causing severe disease—strongly recommends that horses be immunized against EEE and WNE.

Available inactivated whole-virus vaccines against EEE (including Western equine encephalomyelitis) have been shown to be safe and effective in protecting against this disease. Two inactivated whole-virus vaccines, a live canary pox vector vaccine and an inactivated flavivirus chimera vaccine are available against WNE. All have been confirmed safe and effective in preventing the disease.

Despite the AAEP recommendations to horse owners to vaccinate their horses against EEE and WNE, regrettably many fail to do so. The vast majority of equine cases of EEE and WNE either have no history of vaccination against the particular virus or else the vaccination history is incomplete. There is need for an ongoing concerted effort, utilizing all avenues of communication including social media, to alert horse owners of the dangers of these two vector-borne diseases and of the importance of vaccination as an effective means of prevention and averting the losses that continue to occur every year in unprotected horses. **UK**

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UKVDL Adjusts Fees, Adds New Tests and Panels

The UKVDL has adjusted fees and added new tests and panels for this fiscal year, which began July 1.

Thirty-four select test fees have been increased (6.9% overall increase). In addition, three new tests and three new panels have been added.

If a test is part of a panel, the individual test(s) will be priced as listed in the chart below. Please see the UKVDL fee schedule for out-of-state pricing. The out-of-state pricing is usually 1.5 times higher than the listed fees.

Individuals with questions can contact the UKVDL at 859/257-8283 or visit vdl.uky.edu. **UK**

>Craig Carter, DVM, MS, PhD, director of the UKVDL, provided this information.

UKVDL IN-STATE FEE INCREASES AND NEW TESTS - FY2019		
Discipline	Test Name	fy2019 Fee
Bacteriology	Contagious Equine Metritis Culture	\$27.00
Bacteriology	Culture-Aerobic	\$19.00
Bacteriology	Culture-Fungal	\$21.00
Bacteriology	Culture-Salmonella NPIP	\$25.00
Bacteriology	MIC Panel - Equine	\$15.00
Bacteriology	MIC Panel - Companion Animal	\$17.00
Bacteriology	MIC Panel - Fungal	\$40.00
Clinical Pathology	Free T4 (Immulyte) - NEW TEST	\$15.00
Clinical Pathology	Lipase - NEW TEST	\$7.50
Clinical Pathology	Bile Acids - NEW TEST	\$12.50
Clinical Pathology	Canine Thyroid Panel (T3, T4, TSH, Free T4 - NEW PANEL	\$45.00
Clinical Pathology	Non-Canine Thyroid Panel (T3, T4, Free T4) - NEW PANEL	\$40.00
Clinical Pathology	Canine Pancreatic Panel (Amylase, Lipase, TLI) - NEW PANEL	\$35.00
Molecular Biology	Avian Influenza PCR	\$50.00
Pathology	Biopsy	\$52.00
Pathology	Field Necropsy - Food Animal < 1 Year	\$60.00
Pathology	Field Necropsy - Food Animal Adult	\$70.00
Pathology	Field necropsy - Small Animal/Exotic/Petbird/Wildlife	\$85.00
Pathology	Gross Necropsy - Equine Adult	\$275.00
Pathology	Gross Necropsy - Equine Fetus/Foal	\$150.00
Pathology	Gross Necropsy - Equine Placenta	\$70.00
Pathology	Gross Necropsy - Food Animal Adult	\$110.00
Pathology	Gross Necropsy - Food Animal Fetus/Neonate	\$80.00
Pathology	Gross Necropsy - Poultry (up to 3 birds)	\$60.00
Pathology	Gross Necropsy - Small Animal/Exotic Animal	\$140.00
Serology	Avian Influenza - ELISA	\$2.75
Serology	Avian Influenza - AGID	\$2.75
Serology	Contagious Equine Metritis - CF	\$18.00
Serology	Equine Infectious Anemia - ELISA	\$6.00
Serology	Equine Infectious Anemia (Stockyard) - ELISA	\$5.00
Toxicology	Selenium - Whole blood	\$18.00
Toxicology	Selenium - Serum	\$18.00
Toxicology	pH	\$10.00
Toxicology	Nitrate/Nitrite Panel - Forage	\$25.00
Toxicology	Mycotoxin panel	\$170.00
Toxicology	Bromide - Serum	\$22.00
Virology	Bovine Viral Diarrhea - Antigen ELISA	\$4.50
Virology	Equine Viral Arteritis - Virus Neutralization (VN)	\$20.00
Virology	Vesicular Stomatitis IN - Virus Neutralization (VN)	\$19.00
Virology	Vesicular Stomatitis NJ - Virus Neutralization (VN)	\$19.00

Upcoming Events

Aug. 6 – 3:30-8 p.m.

UK Equine Farm & Facilities Expo (rescheduled from June due to weather) Knapper Farm, 485 Chatham Ln, Harrodsburg, KY
Meal and educational topics provided RSV to equine@uky.edu
More info: TheHorse.com/157464

Aug. 30 – 4-5 p.m.

UK Equine Diagnostic and Research Seminar Series
Topic: Managing Horse and Cattle Grazing Fescue
Speakers: Karen McDowell, PhD, EMB, and James Matthews, PhD, MS, of UK
Location: UKVDL

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Join Us for the UK Equine Farm & Facilities Expo

Makeup Date: Monday, August 6, 3:30-8:00 p.m.

**Knapper Farm
485 Chatham Ln
Harrodsburg, KY 40330**

Free meal will be provided!

Program

3:30 - Registration

4:00 - Exhibitor Booths

5:00 - Welcome, Dinner provided by the Mercer County Cattlemen's Association

5:30 - Keynote Speaker: Utilizing Cost Share to Improve Grazing, Profitability and Resource Protection on Horse Farms, Adam Jones, NRCS State Grazing Specialist

6:00-8:00 Educational Sessions, concurrently every half hour:

- **Weed Control Following a Wet Spring, Dr. Bill Witt and Keenan Bishop**
- **Implementing Rotational Grazing on Horse Farms, Steve Musen and Dr. Bob Coleman**
- **Rejuvenating Fall Horse Pastures, Dr. Ray Smith**
- **Maintaining a Healthy Horse, Dr. Justin Murray**

Paul and Melita Knapper run a small Thoroughbred breeding and layup operation just south of Shaker Village of Pleasant Hill. They are also the first of three established demonstration farms showcasing federal cost-share opportunities on equine operations in Kentucky.

RSVP requested to equine@uky.edu or 859-257-2226



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